

WHAT IS CLAIMED IS:

1. A system for managing communication between a mobile platform operating within a pre-defined geographic region and a communications station, the system comprising:

a control system for managing communications within said geographic region;

a mobile platform communications component located on said mobile platform for communicating with said control system;

10 a plurality of antennas located at spaced apart locations within or adjacent said geographic region, each of said antennas being in communication with said control system; and

15 wherein said control system uses an operating characteristic of said mobile platform as said mobile platform operates within said geographic region to inform said mobile platform as to which one of said antennas to communicate with to maintain a communications link between said mobile platform and said control system while reducing a frequency with which said mobile platform is required to switch between different ones of said antennas as said mobile platform moves within said geographic region.

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2. The system of claim 1, wherein said operating characteristic comprises real time position information of said mobile platform.

25 3. The system of claim 1, wherein said operating characteristic comprises real time information relating to a direction of travel of said mobile platform.

30 4. The system of claim 1, wherein said operating characteristic comprises real time information relating to a speed of travel of said mobile platform.

5. The system of claim 1, wherein said control system uses information relating to a loading of each of said antennas in determining which one of said antennas said mobile platform is to use for communication purposes.

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6. A system for managing communications with a mobile platform operating within a pre-defined geographic region, comprising:

a mobile platform communications component located on said  
10 mobile platform for determining a location of said mobile platform while said mobile platform is operating within said pre-defined geographic region;  
at least one antenna located on said mobile platform;  
a ground based component including:

a plurality of antennas located at spaced apart  
15 locations about said pre-defined geographic region;  
a control system in communication with said antennas; and

wherein said control system analyzes location information received by at least one of said antennas and selects a  
20 specific antenna with which said mobile platform communications component is to use for communicating with a network disposed at said pre-defined geographic region, said selection being made based at least in part on real-time location information for said mobile platform.

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7. The system of claim 6, wherein said location information is provided to said control system by said mobile platform.

8. The system of claim 6, wherein said location information is  
30 derived by said control system through multi-lateration techniques.

9. The system of claim 7, wherein said location information is derived from Global Positioning Satellite information and supplied to said control system by said mobile platform communications component.

5 10. The system of claim 6, wherein said selection is further made in consideration of a speed of travel of said mobile platform.

11. The system of claim 6, wherein said selection is further made in consideration of a loading of at least a pair of said antennas.

10 12. The system of claim 6, wherein each said antenna comprises an antenna substation comprised of at least one directional antenna and an omni directional antenna.

15 13. The system of claim 6, wherein said ground based component further includes a hub for facilitating communication between said antennas and said control system.

14. The system of claim 6, wherein each said antenna transmits  
20 a unique beacon signal, and wherein said mobile platform communications component initially selects one of said beacon signals having the strongest signal strength to establish a communications link with said ground based component.

25 15. The system of claim 6, wherein said control system further uses information relating to a speed of travel of said mobile platform to make said selection.

16. The system of claim 6, wherein said control system uses  
30 information related to a direction of travel of said mobile platform to make said selection.

17. A system for managing communications between a mobile platform operating within a pre-defined terrestrial, geographic region, in a manner to minimize interruptions to a communications link established between the mobile platform and a communications center at the  
5 geographic region, the system comprising:

a communications component disposed on said mobile platform, said communications component including a system for providing real time location information;

a ground based component including:

10 a plurality of antenna stations disposed at pre-determined locations about geographic region for providing radio frequency (RF) communications with said mobile platform at any location within said geographic region;

15 a control system in communication with each of said antenna stations; and

wherein said control system uses said location information and a direction of travel of said mobile platform to determine which of said antenna stations to communicate with and to instruct said mobile platform to switch from one  
20 of said antenna stations to another in a manner to minimize a number of changes between said antenna stations while said mobile platform travels within said geographic region, and while maintaining an optimal RF communications link between said mobile platform and said ground component.

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18. The system of claim 17, wherein said mobile platform includes first and second RF antennas each operating at a different frequency.

30 19. The system of claim 17, wherein each said antenna station includes first and second antennas operating at different frequencies.

20. The system of claim 17, wherein the control system uses information concerning a loading of at least a pair of said antenna stations in determining which said antenna stations to instruct said mobile platform to use.

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21. The system of claim 17, wherein said location information comprises real-time information obtained from a Global Positioning Satellite system.

10 22. The system of claim 17, wherein a speed of travel of the mobile platform is used by the control system to select and switch between ones of said antenna stations.

15 23. The system of claim 17, wherein at lease one of said antenna stations is used to inform said mobile platform as to which specific one of said antenna stations to communicate to switch to using.

24. The system of claim 17, wherein each said antenna station includes:

20 a directional antenna;

an omni directional antenna; and

wherein said directional antennas of said antenna stations are directed such that an associated antenna beam of each is directed away from one another.

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25. The system of claim 17, wherein each said antenna station transmits a beacon signal identifying it to said communications component.

26. A method for managing communications within a pre-defined geographic area between a mobile platform operating within the geographic area and a control system, comprising:
- a) using a plurality of ground-based antenna stations, each disposed at fixed locations within the geographic area, to each transmit an identification;
  - b) using a communications component located on said mobile platform to receive said beacon signals and to select an initial one of said antenna stations to establish a communications link with said control system as said mobile platform operates within said geographic region;
  - c) using said control system to communicate with each of said antenna stations and to monitor at least one of speed of travel and direction of travel of said mobile platform within said geographic region;
  - d) using said control system to analyze information obtained at step c) to determine when said mobile platform should switch from communicating with said initial one of said antenna stations to a different one of said antenna stations to maintain an optimal communications link while moving within said geographic region; and
  - e) instructing said communications component, in real time, as to which one of said antenna stations to use to maintain said communications link in a manner which reduces a frequency with which said communications component is required to switch from one said antenna system to another.
27. The method of claim 26, wherein said communications component continuously supplies location information obtained from a Global Positioning Satellite system to said control system via said antenna stations.
28. The method of claim 26, wherein said control system uses multi-lateration to periodically determine at least an approximate direction of travel of said mobile platform.

29. The method of claim 26, wherein said control system uses both of said directional of travel and speed of travel of said mobile platform in determining which one of said antenna stations to instruct said  
5 communications component to switch to so as to maintain said communications link.

30. The method of claim 26, wherein using said antenna stations comprises using antenna stations that each comprise a directional  
10 antenna aimed in different directions.

31. The method of claim 26, wherein using said antenna stations further comprises using at least one directional antenna and one omni directional antenna.

32. The method of claim 26, further comprising using information pertaining to a loading of at least a pair of said antenna stations in determining which one of said antenna stations said communications component is to be instructed to use.

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33. A method for managing communications within a pre-defined geographic area between a mobile platform operating within the geographic area and a control system, comprising:

locating a plurality of ground-based antenna stations, each disposed at  
10 fixed locations within the geographic area;

using at least one of the ground-based antenna stations to transmit an identifying signal;

15 using a communications component located on said mobile platform to receive said identifying signal and to establish a communications link with said control system via said one of said antenna stations as said mobile platform travels within said geographic area;

using said control system to analyze position information relating to said mobile platform as said mobile platform moves within said geographic area;

20 using said control system to determine when said communications component should switch from said one antenna station to a different one of said antenna stations to maintain an optimal communications link with said communications component while minimizing a number of times that switching between different ones of said antenna stations occurs; and

25 using the control system to inform said communications component, via at least one of said antenna stations, which of said antenna stations to switch to so as to maintain said communications link.

34. The method of claim 33, further comprising using said control system to determine a loading of at least a pair of said antenna stations and using said loading in determining which one of said antenna stations to instruct said communications component to switch to.